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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,224	08/08/2006	William G. Tong	07252-025US1	3313
20/985 7590 05/05/2009 FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022				
EXAMINER				
WILDER, CYNTHIA B				
ART UNIT		PAPER NUMBER		
1637				
NOTIFICATION DATE		DELIVERY MODE		
05/05/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

### Office Action Summary

**Application No.**

10/540,224

**Applicant(s)**

TONG, WILLIAM G.

**Examiner**

CYNTHIA B. WILDER

**Art Unit**

1637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,5-7 and 17-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-7 and 17-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB08)
- Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/9/2009 has been entered. Claims 1 and 3 have been amended. Claims 4 and 8-16 have been canceled. Claims 1-3, 5-7 and 17-22 are pending.

### ***New Ground(s) of Rejections***

#### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-3, 5-7 and 17-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a) Claims 1-3, 5-7 and 17-22 are indefinite in the claims 1-3 for the recitation of "an optical wavelength within an absorption spectral range of the DNA cells" because the specification does not provide a limiting definition as to what is encompassed by the term "absorption spectral range of the DNA cells" thus it cannot be determined what optical wavelength Applicant is making reference to such that a DFWM signal is generated in one DNA cell.

(b) Claims 3, 20-22 are indefinite in the claim 3 for the recitation of "spatial inhomogeniety" because the specification does not provide a definition of the term anywhere. Thus, it cannot be determined what is meant by "spatial inhomogeniety within the DNA cells". Clarification is required.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-3, 5-7 and 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandstrom, P (US20030174324, effective filing date August 2000) and further in view Weinberg et al (US 6248540, June 2001) and further in view of Tong (5600444, February 1997).

With regards to claims 1-3, 5-7 and 17-22, Sandstrom provides a method for processing microarrays comprising a plurality oligonucleotides and methods for screening polymers on microarrays to detect biological activity (0126-0142). Sandstrom teaches wherein the microarray is combined with an optical signal detection system comprising an optical detector (0008-0021 and 0039-0053). Sandstrom teaches measuring an output of the optical detector to represent a signal (0167); and removing background noise by scanning a blank area between adjacent DNA cells (0019, 0053, 0148 and 0173) Sandstrom teaches that blank areas allows reduction of background noise (0173) and comparison of non-specific hybridization (0019). Sandstrom et al also teaches determining inhomogeneity of DNA cells at different locations on the microarray pages 13 and 14).

Sandstrom differs from the instant invention in that Sandstrom does not teach wherein the microarray is placed in an optical degenerate four-wave mixing (DFWM) systems or steps for performing the optical DFWM system for analysis.

Weinberg et al teach a method for screening compounds attached to a microarray, wherein said screening of said array further comprise detection via optical spectroscopic techniques (col. 10, lines 12-26 and col. 27, lines 38-44), wherein said optical spectroscopic techniques include the use of a degenerate four wave mixing optical technique that depends on the interaction of three photons to produce the fourth photon, i.e., the signal, and only one wavelength, wherein the signal is a coherent beam easy to detect (col. 28, lines 52-57). Wienberg et al teach that DFWM is unlike fluorescence which is emitted in all directions and is therefore easy to detect at higher

sensitivity (approximately 10,000 molecules under favorable conditions. Wienberg et al teaches that the selectivity of this techniques relies on the absorption properties of the species being detected and can be thought of as being analogous to absorption spectroscopy except that it is more sensitive, more selective and has a higher spatial resolution (col. 34, lines 26-57).

While Weinberg provides sufficient motivation for why one would want to use DFWM for screening a microarray versus other techniques, such as e.g., optical spectroscopy systems based on fluorescence, Weinberg et al does not teach how the DFWM system specifically operates to generate a DFWM signal.

Tongs supports the limitations of the claims 5-7 and 17-22, Tong teach a device and technique for performing highly sensitive spectroscopic measurements in a sample using a four-wave mixing laser beams in nonlinear degenerate four wave mixing optical system (abstract). Tong teaches that the Tong et al teaches alignment template having holes for transmitting beams. Tong et al teach that the templates serve as spatial filters to prevent the scattered background light from reaching the optical detector. Tong et al teach that the template may be made by simply forming four small holes, one for each beam involved in a four wave mixing process, in two thin aluminum plates. Tong et al teach that the template is positioned relative to a furnace chamber so that holes define the path of the forward pump, holes define the path of the probe, holes define the path of the signal beam, and holes define the path of the backward pump. Tong et al teach that the positions of the templates are fixed relative to each other for a desired four wave mixing configuration (col. 4, lines 22-65 and Figure 2). Tong et al teach wherein

the DFWM system comprises backward scattering or forward scattering. Tong teaches that DFWM comprising backward scattering and forward scattering configuration are useful because of the phase conjugate property of the signal beam. Tong teaches that the phase conjugate property of the signal beam generated by an analyte in DFWM method has many potential applications including autocorrection of beam distortion or optical aberration (col. 13, lines 19-35).

It would have been obvious to one of ordinary skill in the art at the time of the claimed invention to use the microarray comprising a plurality of DNA cells as taught by Sandstrom in an optical DFWM system as taught by Weinberg and Tong rather than in the optical analysis systems of Sandstrom. One of ordinary skill in the art would have been motivated to use the DFWM system as taught by Weinberg and Tong based on the advantages taught by both Weinberg and Tong that DFWM is a more sensitive, more selective and has a higher spatial resolution than fluorescent-base optical analysis systems as taught by Sandstrom. The use of an optical DFWM system in combination with microarray analysis is within the ordinary artisan's technical grasp as by suggested by Weinberg.

### ***Conclusion***

7. No claims are allowed. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CYNTHIA B. WILDER whose telephone number is (571)272-0791. The examiner can normally be reached on a flexible schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on (571) 272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia B. Wilder/  
Examiner, Art Unit 1637